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**CERTIFICATION DESIGN LETTER
FOR AREA 1, PHASE II
SECTOR 3 UTILITY TRENCHES**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**



AUGUST 1999

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

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LIST OF ACRONYMS AND ABBREVIATIONS

A1PII	Area 1, Phase II
A1PII-S3UT	Area 1, Phase II Sector 3 Utility Trenches
ASCOC	area-specific constituent of concern
ASL	analytical support level
CDL	Certification Design Letter
COC	constituent of concern
CU	certification unit
CRDL	Contract Required Detection Limit
EPA	U.S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FRL	final remediation level
IRD	Integrated Remedial Design Package
mg/kg	milligram per kilogram
NPDES	National Pollutant Discharge Elimination System
OEPA	Ohio Environmental Protection Agency
OU5	Operable Unit 5
pCi/g	picocuries per gram
ppm	parts per million
PSP	Project Specific Plan
ROD	Record of Decision
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
STP	Sewage Treatment Plant
UCL	Upper Confidence Limit
WAC	waste acceptance criteria

EXECUTIVE SUMMARY

This Certification Design Letter (CDL) describes the certification approach for Area 1, Phase II Sector 3 Utility Trenches (A1PII-S3UT) and includes the following information:

- A definition of the boundaries of the area to be certified under this CDL
- A discussion of the area-specific constituents of concern (ASCOC) selection process and list of ASCOCs
- A presentation of the certification unit (CU) boundaries and proposed sampling strategy
- The analytical requirements and the statistical methodology that will be employed
- The proposed schedule for certification activities.

The scope of this CDL is limited to the certification of the A1PII Sector 3 Utility Trenches. The five CUs in A1PII-S3UT are located within four excavation trenches in the area adjacent to the Sewage Treatment Plant (STP). The sampling will occur during the excavation and removal of these utilities.

The certification design presented in this CDL follows the general approach outlined in Section 3.4 of the Sitewide Excavation Plan (SEP, DOE 1998a). The subject areas are well characterized through several predesign investigation sampling programs and process knowledge. The selection process for the A1PII-S3UT ASCOCs was accomplished using constituent of concern (COC) lists in the Operable Unit 5 (OU5) Record of Decision (ROD, DOE 1996), predesign investigation data, and process knowledge. Sampling will begin in early September 1999.

1.0 INTRODUCTION

This CDL describes the certification approach for demonstrating that soil in the A1PII-S3UT meets the final remediation levels (FRLs) for all applicable ASCOCs. The format of this CDL follows guidelines presented in the SEP and, accordingly, consists of six sections:

- 1.0 Introduction - Presentation of the purpose, objectives, and scope of this CDL
- 2.0 Precertification Data - Discussion of precertification data
- 3.0 Area-Specific Constituents of Concern - Discussion of selection criteria and selected ASCOCs for A1PII-S3UT
- 4.0 Certification Units - Presentation of design, sampling and analytical methodologies
- 5.0 Schedule
- 6.0 References

As discussed in the A1PII Supplemental Characterization Package, submitted February 12, 1999, Area 1, Phase II (A1PII) certification will be performed in an iterative manner, i.e., areas within sectors will be certified in phases. In order to track the certification progress, multiple CDLs will be submitted to the regulatory agencies. Table 1 summarizes all the CDLs that will be submitted for A1PII.

Once the entire area is certified, a final A1PII Certification Report will be submitted, including the CUs discussed in this CDL. A separate Certification Report will not be submitted for the CUs covered in this CDL. A data summary once all the data is received will be submitted to Ohio Environmental Protection Agency (OEPA) and U.S. Environmental Protection Agency (EPA) as an interim deliverable.

The FEMP Certification Master Control Map (Figure 1) is included in all CDLs and Certification Reports in order to track certification status.

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1.1 OBJECTIVES

The primary objectives of this CDL are to:

- Define the boundaries of the area to be certified under this CDL
- Define the ASCOC selection process and list the selected ASCOCs for those areas
- Present the CU boundaries and proposed sampling strategy
- Summarize the analytical requirements and the statistical methodology that will be employed
- Present the proposed schedule for the certification activities.

1.2 SCOPE

The scope of this CDL is limited to the certification of the four A1PIS3UT utility trenches, which consist of five CUs, as shown on Figure 2. The northern most trench, labeled Trench 1 on Figure 2, contains a 4-inch drinking water pipe. The next trench, labeled as Trench 2, contains the following utilities: an 8-inch sanitary sewer pipe, a 3-inch drinking water pipe, a 12-inch waste water effluent pipe, and a 4-inch fuel gas line. Trench 3 contains an electrical conduit. Trench 4 contains a 16-inch storm sewer and a 4-inch fuel gas line.

2.0 HISTORICAL DATA

Before conducting certification activities, all soil demonstrated to contain contamination above the associated FRLs or other applicable action levels must be evaluated for remedial actions in accordance with the SEP. Two predesign investigations were performed to characterize the utility trenches. The first was performed under the Field Sampling of Miscellaneous Areas Project Specific Plan (PSP). Twelve borings (#12310 through #12321) (Figure 3) were placed along the entire length of the STP sanitary sewer influent (Trench 2) and effluent pipeline (Trench 5) the two areas most likely to contain contamination, to identify the presence of radionuclides, sitewide COC and National Pollutant Discharge Elimination System (NPDES) permit metals (As, Be, Pb, Mn, Sb, Cd, Ni, Zn, Cr, Cu, Hg), and volatiles in the adjacent soils. The borings extended to 3 feet below the depth of the pipeline trench, to an approximate total depth of 10 to 15 feet. The results of the pipeline investigation indicated no radionuclide or VOC contamination above the FRLs. The only metal contamination above the FRL was beryllium in four samples at levels ranging from 1.63 to 2.04 mg/kg (ppm), which is within the same order of magnitude as the beryllium FRL of 1.5 mg/kg (ppm). All the data for this sampling program were presented in the A1PII Intergrated Remedial Design Plan (IRDP, DOE 1998b).

A second investigation was performed once the utilities were placed in a safe configuration. The intent of this sampling program was to determine whether the pipe bedding material met waste acceptance criteria (WAC). Sample locations are shown on Figure 4, and again were focused on Trench 2 and 5. Sample results showed total uranium and technetium-99 below the FRL levels. These data are presented in Section 4 of the A1PII Supplemental Characterization Package to the IRDP (DOE 1999).

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3.0 AREA-SPECIFIC CONSTITUENTS OF CONCERN

The selection process for these ASCOCs is discussed in the OU5 ROD. There are 80 soil COCs with established FRLs which were retained for further investigation based on a screening process that considered the presence of the constituent in site soil and the potential risk to a receptor exposed to soil containing this contaminant. In spite of the conservative nature of this COC retention process, many of the COCs with established FRLs have a limited distribution in site soil or the presence of the COC is based on high Contract Required Detection Limits (CRDLs). When the FRLs were established for these COCs in the OU5 ROD, they were initially screened against site data presented on spatial maps to establish a picture of potential remediation areas.

By reviewing existing Remedial Investigation/Feasibility Study data presented on spatial distribution maps, the sitewide list of soil COCs was reduced from 80 to 30. This reduction was possible because the majority of the COCs with FRLs listed in the OU5 ROD have no detections on site above their corresponding FRL, thus eliminating them from further consideration. The 30 remaining sitewide COCs account for over 99 percent of the combined risk to a site receptor model, and they comprise the list from which all of the remediation ASCOCs are drawn. When planning certification for a remediation area, additional selection criteria are used to derive a subset of these 30 COCs. This subset of COCs is used in the certification process.

3.1 SELECTION CRITERIA

The selection process for retaining ASCOCs for a remediation area is driven by applying a set of decision criteria. A soil contaminant will be retained as an A1PII-S3UT ASCOC if:

- It is listed as a soil COC in the OU5 ROD
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment
- Analytical results indicate the contaminant is present at a concentration above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated CRDLs

- Physical characteristics of the contaminant, such as degradation rate and volatility, indicate it is likely to persist in the soil between time of release and remediation
- The contaminant is one of the sitewide primary COCs (total uranium, radium-226, radium-228, thorium-232, and thorium-228).

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Using this process, the ASCOCs for the A1PII-S3UT CUs were identified and are listed in Table 2.

4.0 CERTIFICATION APPROACH

4.1 CERTIFICATION DESIGN

The certification design for A1PII-S3UT follows the general approach outlined in Section 3.4 of the SEP. Since A1PII-S3UT includes non-high density polyethylene pipelines, Approach F from the SEP will be used as a basis for certification design, as described in Section 4.1 of the SEP. Five CUs have been located within A1PII-S3UT as follows:

- **CU A1PII-S3UT-01** - This CU consists of the northern most trench, labeled Trench 1 on Figure 2, contains a 4-inch drinking water pipe
- **CU A1PII-S3UT-02** - This CU is in Trench 2, which contains an 8-inch sanitary sewer pipe
- **CU A1PII-S3UT-03** - This CU is in Trench 2, which contains a 3-inch drinking water pipe, a 12-inch waste water effluent pipe, and a 4 inch fuel gas line
- **CU A1PII-S3UT-04** - This CU is in Trench 3, which contains an electrical conduit.
- **CU A1PII-S3UT-05** - This CU is in Trench 4, which contains a 16-inch storm sewer and a 4-inch fuel gas line.

Figure 2 shows the locations and boundaries of these five CUs. Certification sampling locations were selected following the general requirements of Section 3.4.2 of the SEP. The primary requirement was that sample locations meet the minimum distance criterion for the CU. Since the CUs all have a trench configuration, the process for selecting the sample points was consistent with certification sample location process for the ditch CUs in A1PII Sector 2. The process for selecting the easting coordinate was as follows:

- The easting coordinate is a fixed distance, random start coordinate. The length of the CU was calculated by subtracting the easting coordinate of the mid-point of the CU eastern edge from the mid-point at the western edge. This was done for separately for each CU.
- This distance was then divided by the number of samples to be taken (16), which gives the length (in the northing direction) of each sub-CU.

- From the eastern most sub-CU a random easting coordinate is generated. This value was used as an off-set for all of the other respective sub-CUs. For example, the random easting was 15 feet from the southern boundary of the sub-CU, each additional sub-CU will be sampled at a location 15 feet from its eastern boundary. This provides an even distribution of samples.

For the northing coordinate the process was as follows:

- The ditches are approximately straight at these intervals. A center line was defined from eastern mid-point to western mid-point.
- By using the easting coordinate generated above, the northing coordinate was calculated at the center line at that easting. For each of these northing coordinates a random generated off-set was determined based on the maximum width of the ditch. This is essentially a random number (from 0 to 1) times the max width minus one-half the maximum width. This number was added to the calculated center line. This number can be either positive or negative. A positive offset moves the location north and a negative moves the location south.
- Once the northing and easting coordinates were determined, the random locations were overlain on a CU map. If the random northing fell outside the CU boundaries (because the ditches are not a constant width), then a random number was generated between 0 and 4 was generated as a 'corrective' offset (i.e., moved to the north or south to put the sample location back inside the CU).

In summary, the easting coordinate is a fixed distance random start location, and the northing coordinate is a random location within the width of the CU.

4.2 SAMPLING

As discussed in the PSP for Certification Sampling of Area 1, Phase III Sector 3 Utility Trench Sampling, sampling will occur during the excavation of the trenches and the removal of the utilities. Section 4 of the A1PII Supplemental Characterization Package discusses the process for the removal of the utilities and the disposition of the material excavated. Once the pipe and bedding material has been removed, the trench will be overexcavated at the designated sample locations, and soil will be placed adjacent to the trench. The soil material will then be scanned using real-time instrumentation. If the real-time equipment shows below FRL conditions the certification sample will be taken from the soil temporarily stockpiled. The trench will then be backfilled for safety purposes. Of the 16 certification

samples, all will be submitted for analysis. Further information regarding the sampling process is discussed in the PSP.

4.3 ANALYTICAL METHODOLOGY AND STATISTICAL ANALYSIS

Laboratory analysis of certification samples will be conducted using an approved analytical method, as discussed in Appendix H of the SEP. Analyses will be conducted to Analytical Support Level (ASL) E, where all requirements are the same as ASL D except the minimum detection level for the selected analytical method must be at least 10 percent of FRL. One of the four CUs will be validated to ASL D. Samples rejected during this validation will be reanalyzed, or an archive sample may be substituted if there is insufficient material available from the initial sample. If any sample fails this validation, all data from the laboratory with the rejected result will then be validated to determine the integrity of all data from that laboratory. Once data are validated, results will be entered into the Sitewide Environmental Database (SED), and a statistical analysis will be performed to evaluate the pass/fail criteria for the each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP.

Two criteria must be met for the CU to pass certification. If the data distribution is normal or lognormal, the first criterion compares the 95 percent Upper Confidence Limit (UCL) on the mean of each primary COC to its FRL. On an individual CU basis, any ASCOC with the 95 percent UCL above the FRL results in that CU failing certification. If the data distribution is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP will be used to evaluate the second criterion. The second criterion is related to the two-times the FRL (2xFRL) hot spot criterion. A CU will fail certification if a single total uranium, thorium-232, or radium-226 result exceeds 2xFRL. When the given UCL on the mean for each COC is less than its FRL, and the 2xFRL hot-spot criterion is met, the CU has met both criteria and will be considered certified.

There are three conditions that could result in a CU failing certification: 1) high variability in the data set, 2) localized contamination, and 3) widespread contamination. Details on the evaluation and responses to these possible outcomes are provided in Section 3.4.5 of the SEP. When all CUs within the scope of this CDL have passed certification, a Certification Report will be issued. The Certification Report will be submitted to the regulatory agencies to receive acknowledgment that the pertinent operable unit remedial actions were completed and the individual CUs are certified to be released for

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interim or final land use. Section 7.4 of the SEP provides additional details and describes the required
content of the Certification Report.

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5.0 SCHEDULE

The following draft schedule shows key activities for the completion of the work within the scope of this CDL.

<u>ACTIVITY</u>	<u>TARGET DATE</u>
Submit Certification Design Letter	August 30, 1999
Start of Field Work	September 7, 1999
Complete Field Work	September 20, 1999
Complete Analytical Work	October 29, 1999
Complete Data Validation and Statistical Analysis	November 29, 1999
Submit Certification Report*	February 1, 1999

- * The data from this CDL will be submitted with the final Certification Report for A1PII. A data summary once all the data is received will be submitted to OEPA and EPA as an interim deliverable.

REFERENCES

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3 U.S. Department of Energy, 1996, "Record of Decision for Remedial Action at Operable Unit 5,"
4 Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.
5
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7 Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.
8
9 U.S. Department of Energy, 1998b, "Area 1, Phase II Integrated Remedial Design Package," Draft,
10 Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.
11
12 U.S. Department of Energy, 1999, "Area 1, Phase II Supplemental Characterization Package," Final,
13 Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

TABLE 1
A1PII CERTIFICATION DESIGN LETTERS

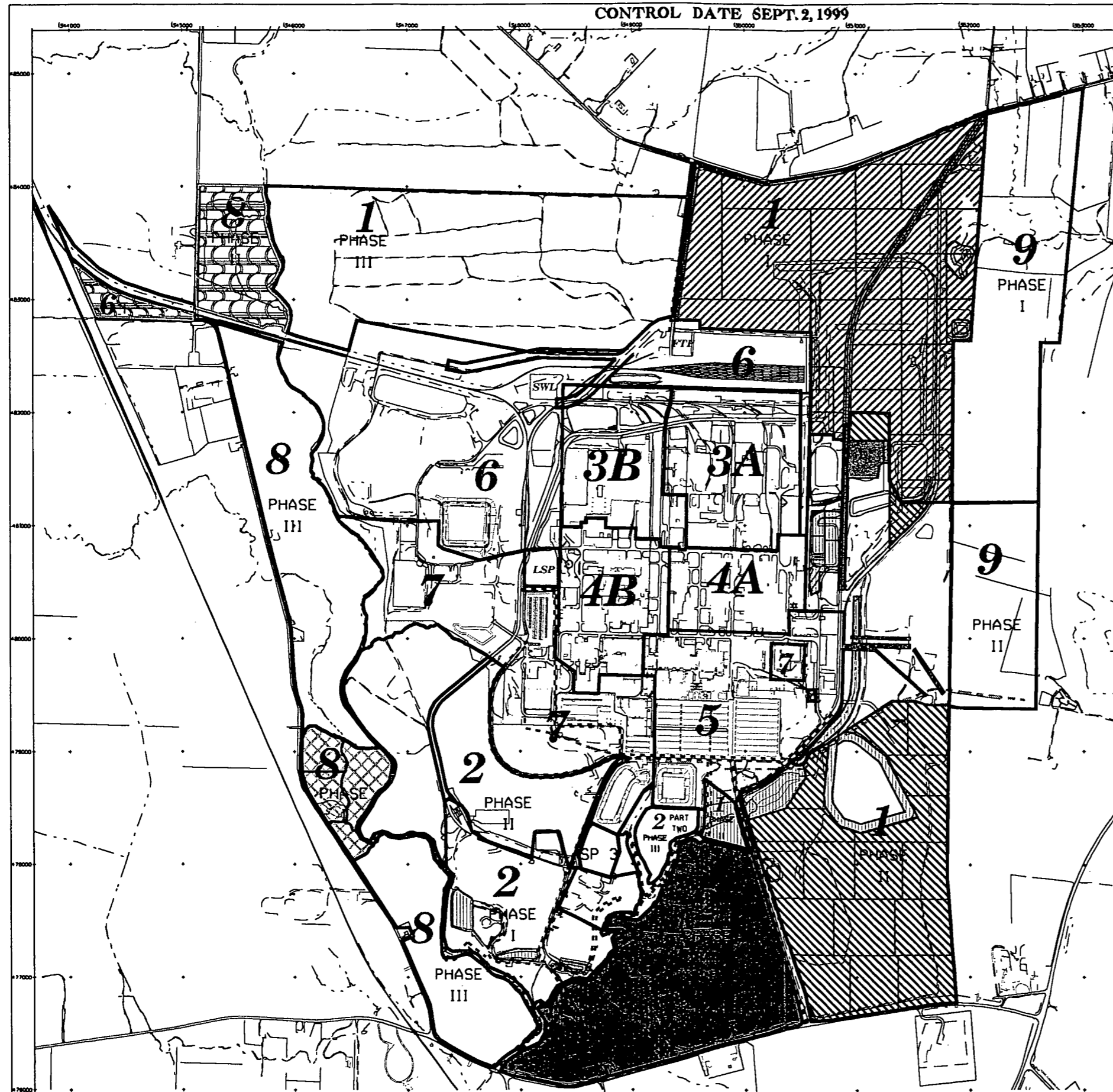
CDL - Scope	CDL Submittal	Certification Report
Sector 1, Sector 2A, Conveyance Ditch	Complete	Complete
Sector 2B	Complete	Complete
Sector 3 Utility Trenches	Current Document	Submitted with Final A1PII Report
Sector 1B, Sector 2C and 2D, and Sector 3	10/31/99	Final A1PII Report

TABLE 2
ASCOC LIST FOR AREA 1, PHASE II SECTOR 3 UTILITY TRENCH CUs

ASCOC	FRL	Reason Retained
Total Uranium	82 mg/kg	Retained as a primary ASCOC sitewide
Radium-226	1.7 pCi/g	Retained as a primary ASCOC sitewide
Radium-228	1.8 pCi/g	Retained as a primary ASCOC sitewide
Thorium-228	1.7 pCi/g	Retained as a primary ASCOC sitewide
Thorium-232	1.5 pCi/g	Retained as a primary ASCOC sitewide
Technetium-99	30.0 pCi/g	Retained as a primary ASCOC due to previous detected results in the area
Beryllium	1.5 mg/kg	Retained as a secondary ASCOC due to previous detected results in the area

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LEGEND:

- A1P11 APPROVED CERTIFIED AREAS - 80.1 ACRES
- CHARACTERIZATION FOR REUSE AREAS - 20.2 ACRES
- AREAS EXCLUDED FROM A1P1
- A1P1 APPROVED CERTIFIED AREAS - 120.5 ACRES
- A8P1 APPROVED CERTIFIED AREAS - 12.5 ACRES
- A1P1 SEDIMENT TRAPS 2 AND (AGENCY APPROVED) 1.4 ACRES
- A1P2-S2B (PENDING) 1.5 ACRES
- A8P11/A6TA (PENDING) - 22.1 ACRES
- A2P111 PART ONE AREAS (CERTIFICATION SAMPLES BEING COLLECTED)
- A1P11 SECTOR 3 UTILITY TRENCHES

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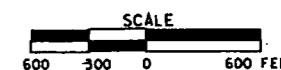
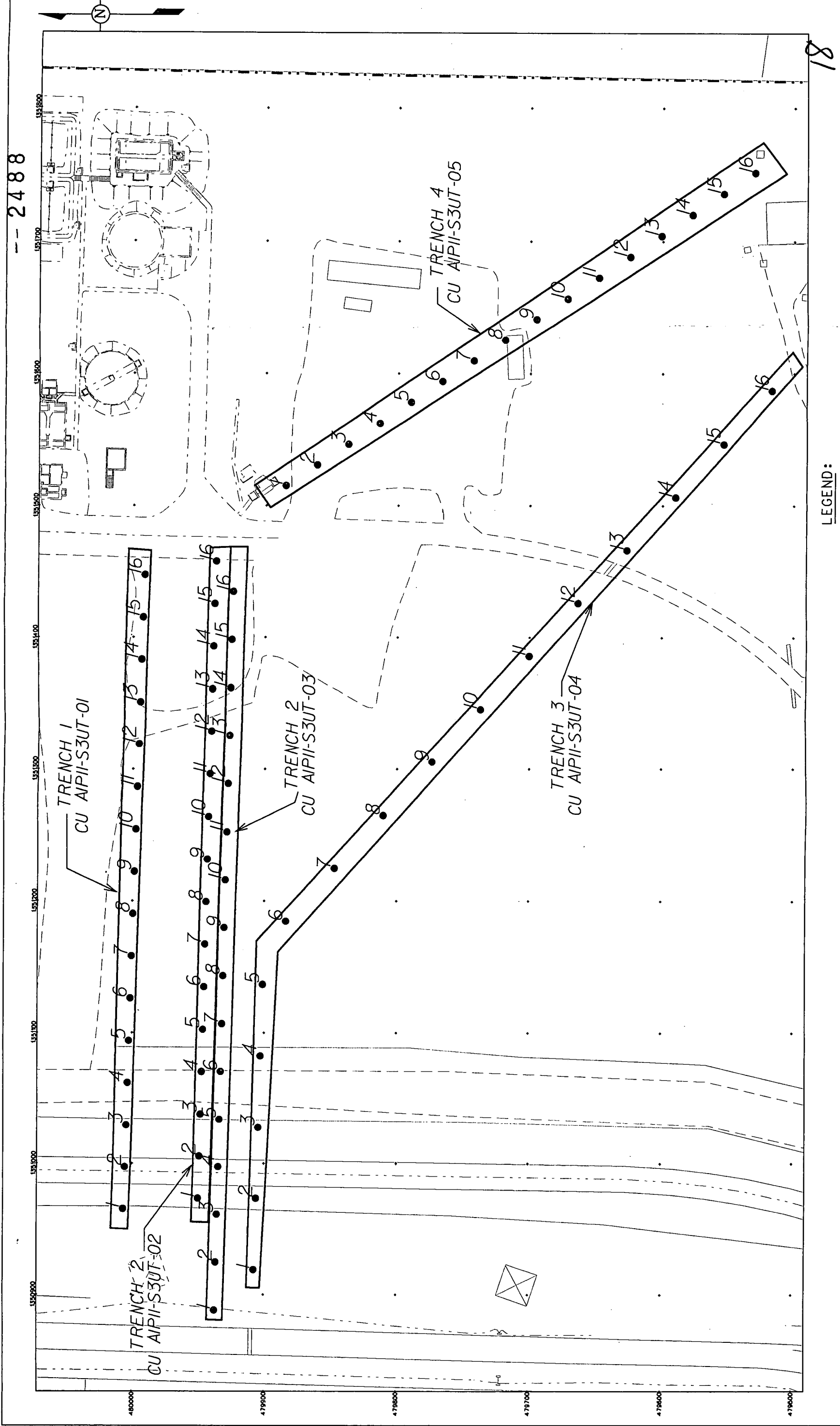
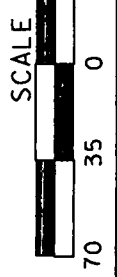


FIGURE 1. CERTIFIED AND CHARACTERIZED FOR REUSE AREAS



LEGEND:

— FEMP BOUNDARY



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FIGURE 2. CERTIFICATION SAMPLE LOCATIONS

v:\56103\edg\shp\seffluent.dgn

STATE PLANNING COORDINATE SYSTEM 1983

30-AUG-1999

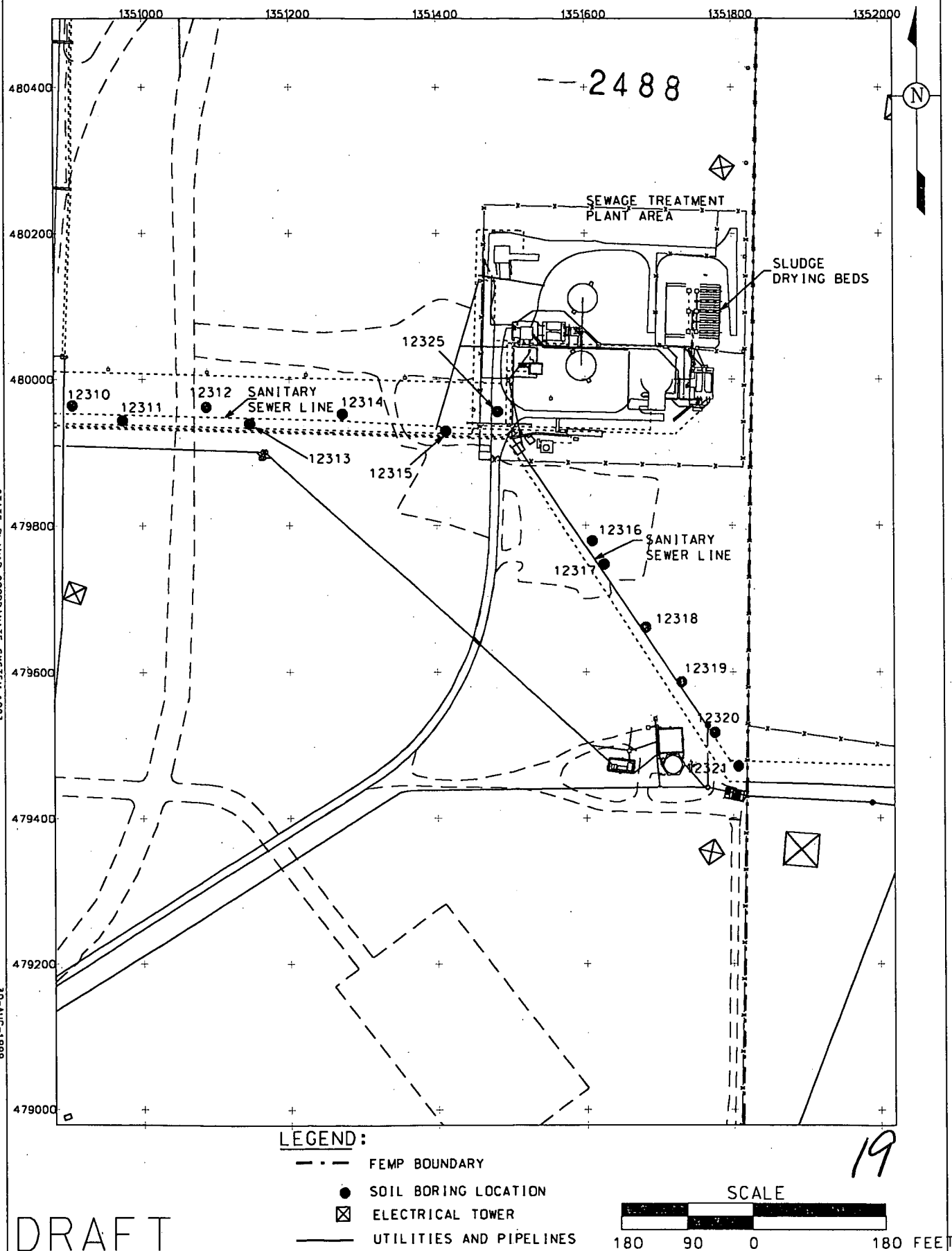


FIGURE 3. MISCELLANEOUS AREAS PSP SAMPLE LOCATIONS

v:\55\31\edg\dwg\dwg\01.dgn

STATE PLANNING COORDINATE SYSTEM 1983

30-AUG-1999

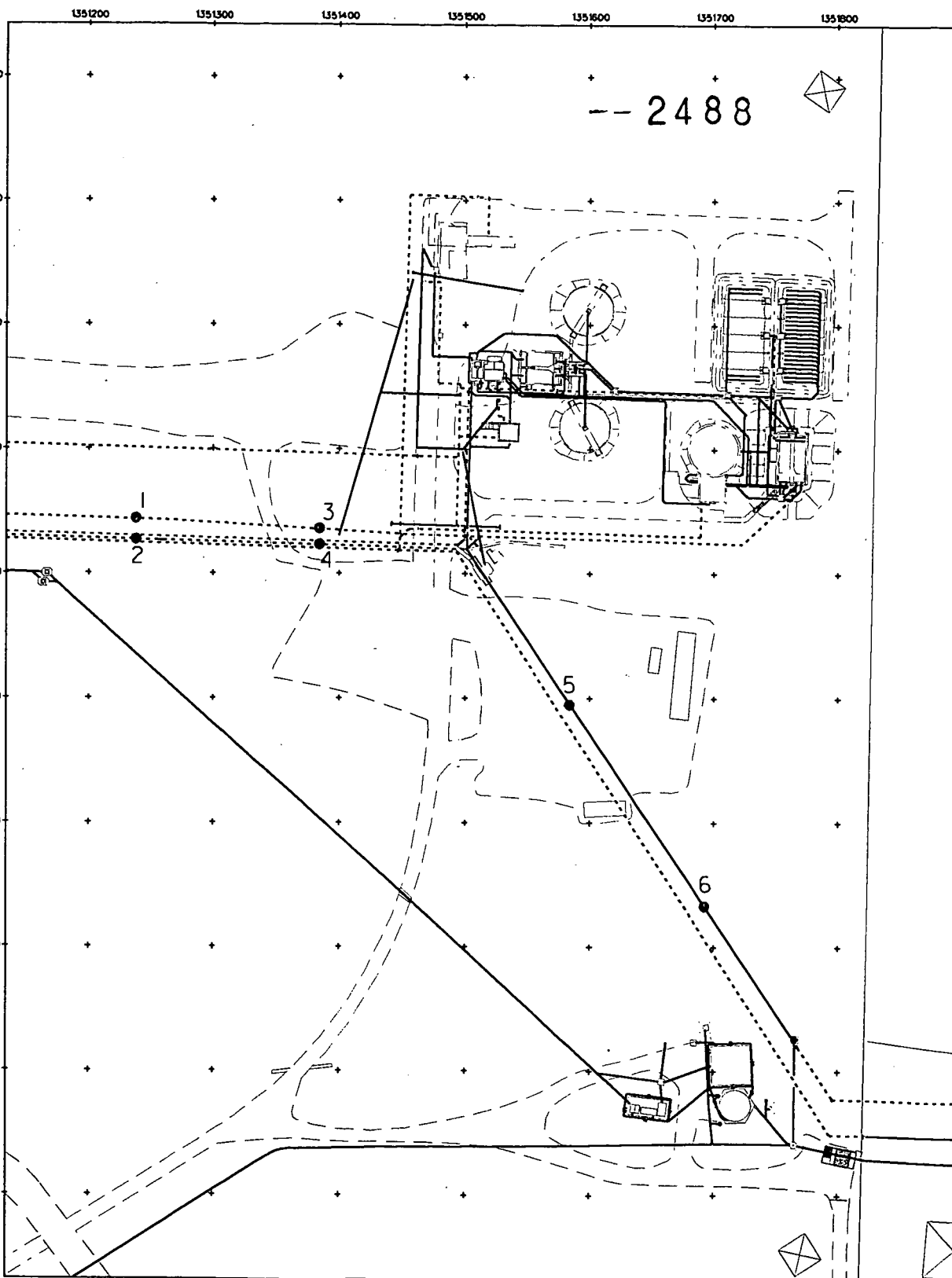


FIGURE 4. PIPE BEDDING SAMPLE LOCATIONS